PATENT ABSTRACTS OF JAPAN

(11)Publication number : 05-121785

(43)Date of publication of application : 18.05.1993

(51)Int.Cl. H01L 33/00

(21)Application number : 03-309727

(22)Date of filing : 28.10.1991

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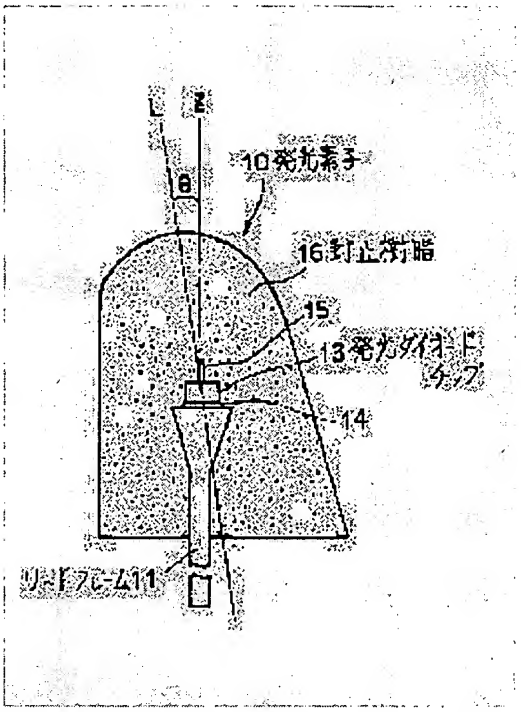
(54) LIGHT EMITTING DIODE

(57)Abstract:

PURPOSE: To enable the brightest direction of a light emitting element to be tilted without inclining a substrate or forming a lead so as to control an optical axis.

CONSTITUTION: A light emitting diode chip 13 mounted on a lead frame 11 is sealed up with a transparent resin 16 which serves also as an optical lens. The optical axis L of the sealing resin lens 16 is tilted against a center axis z of the lead frame 11. As a result, the brightest direction of the light emitting element 10 is tilted against the center axis z of the lead frame 11.



LEGAL STATUS

[Date of request for examination] 25.09.1998

[Date of sending the examiner's decision of rejection] 20.02.2001

[Kind of final disposal of application other than the examiner's decision of rejection or application converted registration]

[Date of final disposal for application]

[Patent number]

[Date of registration]

[Number of appeal against examiner's decision of rejection]

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[Date of extinction of right]

* NOTICES *

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CLAIMS

[Claim(s)]
[Claim 1] The light emitting device characterized by making the optical axis of said optical lens incline to the center line of the leadframe passing through the core of a light emitting diode chip in the light emitting device which closed the perimeter of the light emitting diode chip carried at the tip of a leadframe by translucency resin, and convex was incurvated and made the apical surface of the closure resin with the optical lens.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Industrial Application] This invention relates to the light emitting device used for the luminescence display element of for example, an information guide plate etc.
[0002]
[Description of the Prior Art] The general light emitting device used for the luminescence display element of an information guide plate etc. is shown in drawing 8 and drawing 9 . This light emitting device has two parallel leadframes 21 and 22, carries out wirebonding of the light emitting diode chip 23 carried at the tip of one of these at the tip of the leadframe 22 of another side, and has composition which closed the perimeter of the light emitting diode chip 23 by translucency resin. Closure resin 24 was used as the shell mold with which the apical surface curved to convex, and serves as the optical lens. The optical axis L of an optical lens is in agreement with the center line z of the leadframe 21 passing through the core of the light emitting diode chip 23.
[0003] And if a light emitting device since what arranged this light emitting device to the substrate 20 at the shape of a dot matrix as shown in drawing 10 , and was unified in the drive system is in agreement with the center line of the leadframe 21 by which it is an information guide plate and the lens optical axis z of a light emitting device passes along the core of the light emitting diode chip 23 is attached in a substrate 20 as it is, that lens optical axis L will become perpendicular to a substrate 20.
[0004]
[Problem(s) to be Solved by the Invention] By the way, as for an information guide plate, it is common to be installed in the place higher than the location of the eyes of those, who see, for how many minutes on the character. Therefore, the consideration turned to the eyes of those who look at the brightest direction of a light emitting device (henceforth a component shaft) is needed. And as for the case of an information guide plate perpendicular to a substrate, only in the predetermined include angle theta, the lens optical axis L of a light emitting device needs to lean a substrate caudad as the consideration. Moreover, as shown in drawing 11 , when not leaning a substrate 20, it is necessary to lean a component shaft with the so-called lead foaming which bends the leadframes 21 and 22 of a light emitting device.
[0005] However, it is necessary to pay consideration sufficient [an information guide plate is heavy bulky, and] when leaning and installing the whole guide plate for the design of the structure material for immobilization on the strength, and also when leaning and setting a substrate 20 within an information guide plate, evils, like a guide plate becomes thick cannot be avoided. Moreover, self-chambering to a substrate 20 becomes difficult [the light emitting device which received lead foaming], and foaming after loading also serves as a big adverse element on precision and a man day. Therefore, in leaning a component shaft, neither the inclination of a substrate 20 nor lead foaming can say it as a desirable cure.
[0006] In originating this invention in view of this situation, and leaning a component shaft, it aims at offering the light emitting device of the component plunge mold which needs neither the inclination of a substrate, nor lead foaming.
[0007]

[Means for Solving the Problem] The light emitting device concerning this invention closes the perimeter of the light emitting diode chip carried at the tip of a leadframe by translucency resin, and is characterized by making the optical axis of said optical lens incline to the center line of the leadframe passing through the core of a light emitting diode chip in the light emitting device which convex was incurvated and made the apical surface of the closure resin with the optical lens.
[0008]
[Function] Since the component shaft of a light emitting device, i.e., the brightest direction, is in agreement with a lens optical axis, when a lens optical axis inclines to the center line of the leadframe passing through the core of a light emitting diode chip, a component shaft will incline to the center line of a leadframe.
[0009]
[Example] Hereafter, the example of this invention is explained with reference to a drawing. It is drawing of longitudinal section of the information guide plate with which drawing of longitudinal section of the light emitting device which drawing 1 requires for one example of this invention, and drawing 2 used the cross-sectional view of this light emitting device, and drawing 3 used this light emitting device.
[0010] A light emitting device 10 has two parallel leadframes 11 and 12. Die bonding of the light emitting diode chip 13 is carried out at the tip of one leadframe 11 by the conductive binder 14. WANYA bonding of the light emitting diode chip 13 and the tip of the leadframe 12 of another side is carried out with lead wire 15. And the closure of the point perimeter of two parallel leadframes 11 and 12 is carried out considering the light emitting diode chip 13 as a core with translucency resin, such as an epoxy resin.
[0011] This closure resin 16 is used as the shell mold with which the apical surface curved to the front, and the point has become an optical lens. And to the medial axis z of the leadframe 11 by which the medial axis of the whole closure resin including the optical axis L of an optical lens passes along the light emitting diode chip 13, after only the include angle theta has inclined, leadframes 11 and 12 are inserted in closure resin 16. Thereby, as for the brightest direction (it is in agreement with a lens optical axis), i.e., the component shaft, of a light emitting device 10, only an include angle theta inclines to the medial axis z of a leadframe 11.
[0012] Consequently, if the leadframes 11 and 12 of a light emitting device 10 are attached in a substrate 20 as they are, as for a component shaft, only an include angle theta inclines to the vertical line of a substrate 20. Therefore, in making a component shaft incline to a horizontal line, the inclination of a substrate 20 and the need for lead foaming are lost. In addition, theta is usually made into about 5-30 degrees whenever [tilt-angle / of the lens optical axis L over the medial axis z of a leadframe 11].
[0013] Although closure resin 16 has the composition of having made the medial axis of the whole inclining to the medial axis z of a leadframe 11, in the above-mentioned example, as shown in drawing 4 , it can also be considered as the configuration of a closure resin point which made the optical axis L incline to the medial axis z of a leadframe 11 only about an optical lens part mostly.
[0014] You may be 2 color light emitting device which carried two kinds of light emitting diode chips 13a and 13b with which the luminescent color differs in the central leadframe 11, and carried out wirebonding of each to the leadframes 12a and 12b of both sides especially about the part except the closure resin 16 of a light emitting device 10 as it did not limit, for example, was shown in drawing 5 and drawing 6 . Moreover, as shown in drawing 7 , use of the leadframe 11 which formed the reflective cup 17 at the tip is also possible, and bright luminescence which has symmetric property in a luminous-intensity-distribution property is obtained in that case by using the leadframe 11 which bent the reflective cup 17 so that the medial axis of the reflective cup 17 may be in agreement with a lens optical axis.
[0015]
[Effect of the Invention] As mentioned above, also when it seems that a component shaft is made to incline to the substrate of an information guide plate when based on the light emitting device concerning this invention since a component shaft inclines to a leadframe, a substrate is made to incline or optical-

axis actuation of bending a leadframe becomes unnecessary. Therefore, installation of an information guide plate etc. becomes easy, and self-chambering by the feeder becomes possible.

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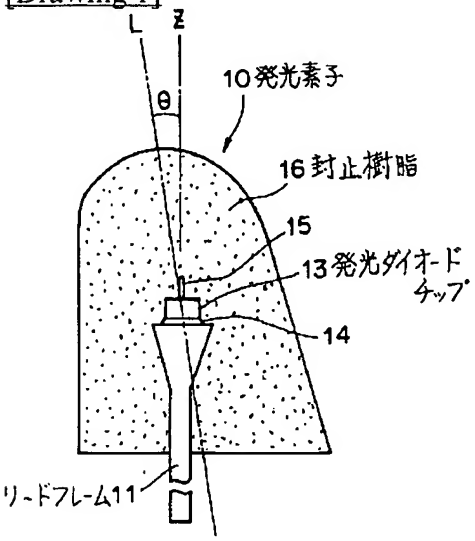
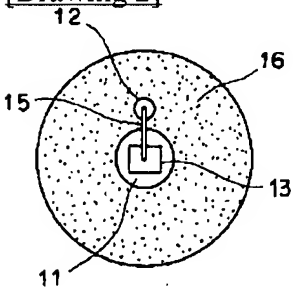
DRAWINGS

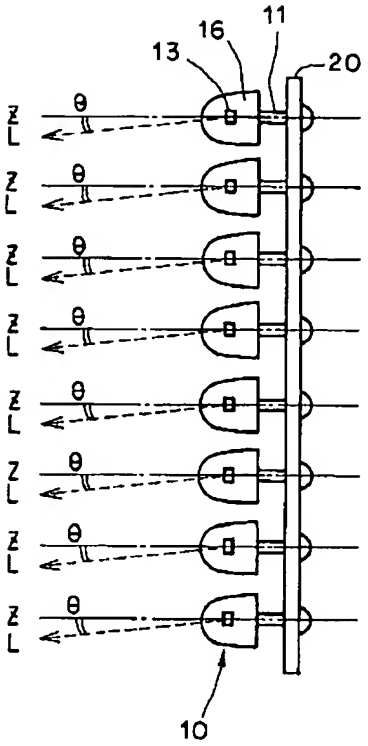
[Drawing 1]



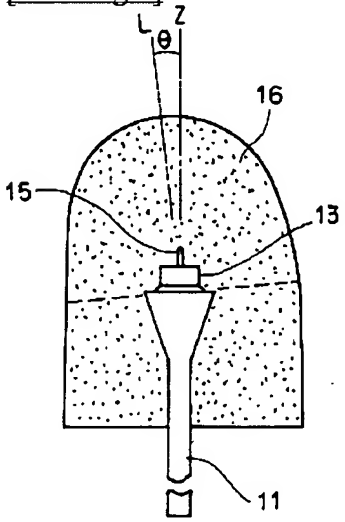
[Drawing 2]



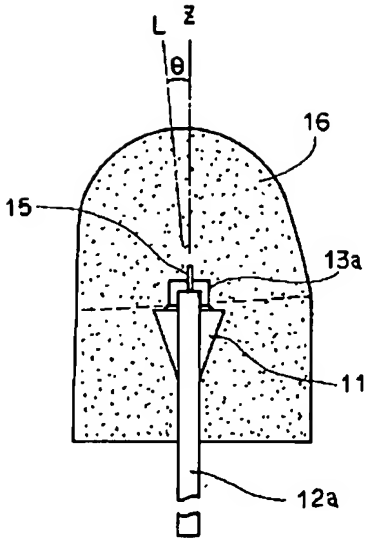
[Drawing 3]



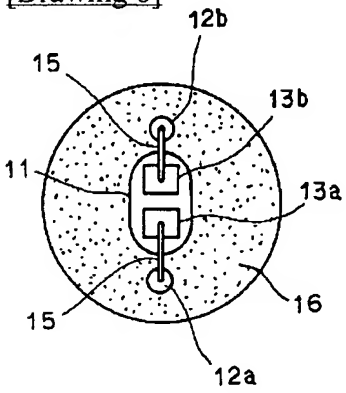
[Drawing 4]



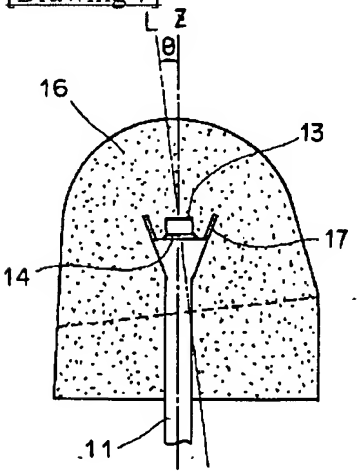
[Drawing 5]



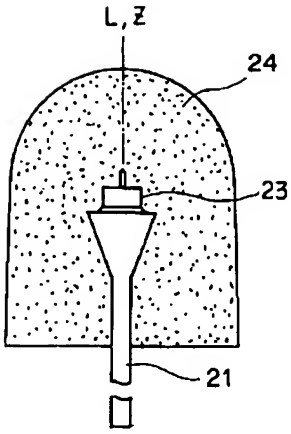
[Drawing 6]



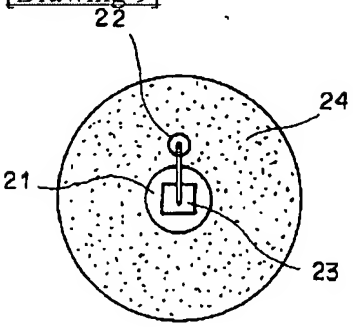
[Drawing 7]



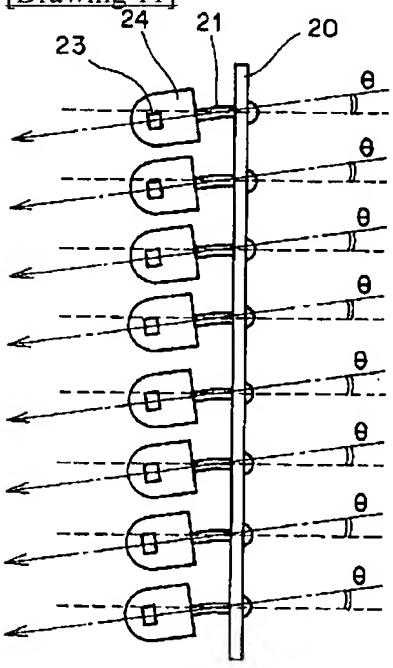
[Drawing 8]



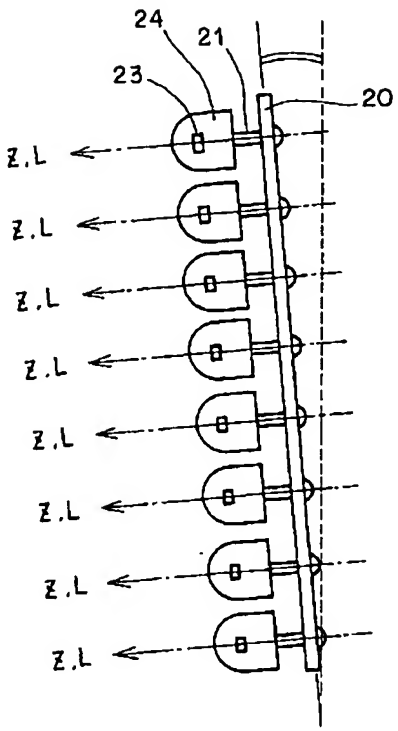
[Drawing 9]



[Drawing 11]



[Drawing 10]



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